

SUBJECT COPIES:

Electronics Park December 16, 1958

Dr. Adrian Kantrowitz
Maimonides Hospital of Brooklyn
4802 10th Avenue
Brooklyn, New York

Dear Dr. Kantrowitz:

Our meeting in New York last week was a most interesting experience to me and I hope will represent the beginning of a fruitful relationship between our two Laboratories. I returned from Washington just yesterday and, consequently, have not gotten off to a detailed start on the problem you outlined. However, our "heart" group had a meeting today in which I reported to them the results of our discussions last week. Several questions arose as a result of these discussions which I think you may be able to answer in correspondence with us.

The first question relates to the noise problem which is quite apparent in the electrocardiograph of an active subject. To design electronic equipment which picks the R-wave out of the noise would involve sophistication of a fairly high degree and thus may necessitate overly complex equipment. However, the thought occurred to us that for the first model, which utilizes external equipment in order to make laboratory adjustments possible, the heart beat may be picked up either from the chest or pulse by simple audio means (such as a microphone) and amplified for the trigger signal. In order to make sure that your booster heart continues working in the event of a natural heart failure, the stimulating signal would be generated by a free-running oscillator that is normally synchronized to the natural heart beat, but which can continue to run on its own at the normal heart period in the event of natural heart failure. Does this idea sound practical to you?

The next thought which occurred to us was that for the ultimate equipment, which we still hope can be completely self-contained within the body, the electrical signal may be picked up from an internal point where noise is not present. For example, can we obtain an electrical signal directly from the aorta, or perhaps from the pulmonary artery, and would this signal be free of the noise which is present in an electrocardiograph taken externally on an active subject.



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For the ultimate equipment completely self-contained within the body, the major problem is still one of obtaining an energy source that may be relied on for the life of the individual. We have not approached our battery experts as yet, but whatever thought you can give to what possible internal organs may be tapped for either mechanical, electrical or thermal energy will be of significant value to us as we progress in the work.

I hope your Administration found the legal terms acceptable and we will look forward to having you visit us as soon as we feel our ideas are adequately crystalized.

Sincerely,

J. J. Suran

Manager - Advanced Circuits Electronics Laboratory

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